Communicable Disease Management Protocol

Seasonal Influenza

Manitoba

Communicable Disease Control Branch

1. Definitions

1.1 Confirmed Case

Influenza-like illness (ILI)[a] with laboratory confirmation of infection. Laboratory confirmation includes at least one of:

- Isolation of influenza virus from an appropriate clinical specimen

  OR

- Detection of influenza virus nucleic acid by nucleic acid amplification test (NAAT)

  OR

- Demonstration of influenza virus antigen in an appropriate clinical specimen

  OR

- Seroconversion or a significant rise in influenza IgG titre between acute and convalescent sera by any standard serologic assay (1).

1.2 Probable (Clinical) Case

Influenza-like illness (ILI)[a] in a person in the absence of laboratory confirmation of infection (i.e., testing has not been performed) when the presence of influenza virus has been confirmed in the region or community (1).

1.3 Institutional Outbreak

Two or more cases of ILI[a] (including at least one laboratory-confirmed case) occurring within a seven-day period in an institution[b].

1.4 School Outbreak

Greater than 10% absenteeism or absenteeism that is higher than the expected level for that school which is likely due to ILI[a]. School outbreaks are an indication of community transmission of influenza (2).

2. Reporting Requirements

2.1 Laboratory

- All positive influenza laboratory results must be faxed to Manitoba Health, Public Health Surveillance Unit (204-948-3044 secure fax).

Clinical laboratories are required to submit isolate sub-cultures or primary specimen from individuals who tested positive for influenza virus to Cadham Provincial Laboratory (CPL) within seven days of report.

2.2 Health Care Professional

- The local public health unit should be notified immediately by the facility health care professional when the institutional outbreak definition is met. Outside of regular business hours, contact the on-call Medical Officer of Health at 204-788-8666. The initial assessment and the final report sections of the *Outbreak Report* form should be completed for all institutional outbreaks by the facility health care professional and faxed to Manitoba Health, Public Health Surveillance Unit (form available at: www.gov.mb.ca/health/publichealth/cdc/protocol/form10.pdf).

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a Influenza-like illness (ILI) is characterized as: acute onset of respiratory illness with fever and cough and with one or more of the following:

- Sore throat
- Arthralgia (joint pain)
- Myalgia (muscular pain)
- Prostration (extreme exhaustion) that could be due to influenza virus

In children < 5 years of age, gastrointestinal symptoms (e.g., nausea, vomiting, diarrhea) may be present. In patients < 5 years or ≥ 65 years old, fever may not be prominent. Note: Illness associated with novel influenza viruses may present with other symptoms (1).

b Including but not limited to hospitals, personal care homes, long term care facilities for both adults and children and correctional facilities (1, 2).

- Deaths among individuals with ILI residing in an institution with a lab-confirmed influenza outbreak are also reportable by facility health care professional to Manitoba Health, Public Health Surveillance Unit (form available at: www.gov.mb.ca/health/publichealth/cdc/protocol/form2.pdf).
- Adverse events following immunization should be reported by health care professional within seven days of becoming aware of the event (form available at: www.gov.mb.ca/health/publichealth/cdc/docs/aefi_form.pdf).

3. Surveillance

- Manitoba's Weekly Influenza Report is available at: www.gov.mb.ca/health/publichealth/surveillance/reports.html#influenza
- Public Health Agency of Canada's FluWatch Sentinels - Weekly Reports available at: FluWatch (www.phac-aspc.gc.ca/fluwatch/)

4. Clinical Presentation/Natural History

Influenza is an acute viral infection of the respiratory tract characterized by fever, cough (usually dry), sore throat, arthralgia, myalgia and prostration (3). Other symptoms may include headache and coryza (3). Cough is often severe and can last two or more weeks. Fever and other symptoms when present, usually resolve in five to seven days (3). Influenza may be clinically indistinguishable from other viral respiratory diseases (e.g., rhinovirus) (3), and approximately 50% will not develop the classical symptoms described above (4).

A high rate of secondary complications, particularly otitis media and pneumonia occur in children with influenza infection (5). The most frequent complication of influenza is pneumonia, usually secondary bacterial pneumonia (4). Primary influenza viral pneumonia is an uncommon complication, but when it occurs, has a high fatality rate (4). Table 1 below lists people at higher risk of influenza-related complications or those more likely to require hospitalization (6). Most deaths associated with influenza in industrialized countries occur in individuals 65 years of age and older (7).

Table 1: People at high risk of influenza-related complications or those more likely to require hospitalization.

- Adults (including pregnant women) and children with the following chronic health conditions:
  - cardiac or pulmonary disorders (including bronchopulmonary dysplasia, cystic fibrosis and asthma);
  - diabetes mellitus and other metabolic diseases;
  - cancer, immune compromising conditions (due to underlying disease and/or therapy);
  - renal disease;
  - anemia or hemoglobinopathy;
  - conditions that compromise the management of respiratory secretions and are associated with an increased risk of aspiration;
  - morbid obesity (BMI ≥ 40); and
  - children and adolescents with conditions treated for long periods with acetylsalicylic acid (6).
- Individuals of any age who are residents of nursing homes and other chronic care facilities (6).
- Individuals ≥ 65 years of age (6).
- Healthy children 6 months to 4 years of age (8, 9, 10).
- Healthy pregnant women (the risk of influenza-related hospitalization increases with length of gestation, i.e., it is higher in the third than the second trimester) (6) and women up to two weeks postpartum regardless of how the pregnancy ended (8, 11).
- Aboriginal peoples (6).

5. Etiology

Three distinct types of seasonal influenza virus are recognized based on major antigenic differences: A, B and C (3-5). Influenza A viruses, are divided into subtypes based on the expression of two surface glycoproteins; the hemagglutinin (H) and the

neuraminidase (N). There are numerous H and N subtypes. Mutations in the genes encoding the H and N glycoproteins during replication result in the constant emergence of new strains of influenza A viruses (3). Both influenza A and B viruses can cause seasonal outbreaks of influenza (3); however, antigenic variation occurs more slowly in influenza B viruses. Influenza B generally causes milder disease than type A and primarily affects children (4). Type C influenza is rarely reported as a cause of human illness and has not been associated with epidemics (4).

The nomenclature of influenza virus is described by the geographic site of isolation, the laboratory number, the year of isolation and virus subtype (subtype is for A viruses only). Examples are: A/New Caledonia/20/99(H1N1) and A/Brisbane/10/2007(H3N2) and B/Malaysia/2506/2004 (3).

6. Epidemiology

6.1 Reservoir and Source

Humans are the only known reservoir of influenza types B and C viruses (4). Influenza A may infect both humans and animals (4).

6.2 Transmission

Person to person transmission through large respiratory droplets when infected persons cough or sneeze is believed to be the primary transmission route (3-4). Transmission may also occur through direct or indirect contact with respiratory secretions (e.g., touching surfaces contaminated with influenza virus and then touching the eyes, nose or mouth) (4). Individuals with asymptomatic infection can transmit virus to susceptible individuals (e.g., asymptomatic health care worker to patient) (12, 13). Human influenza viruses may persist for hours on solid surfaces, particularly in lower temperatures and lower humidity (3).

6.3 Occurrence

General: Influenza infection causes pandemics, epidemics, localized outbreaks and sporadic cases. Pandemics occurred in 1889, 1918, 1957, 1968 and 2009. Influenza epidemics occur annually in autumn and winter months in temperate regions resulting in three to five million cases of severe illness and about 250,000 to 500,000 deaths globally (7). Attack rates in unvaccinated populations in epidemics are estimated to be 10%-20% (5) but may be much higher in closed populations (3). Influenza attack rates are higher in children than in adults (5).

Between September 2010 and January 2011, the majority of influenza A (H1N1) viruses detected worldwide were the pandemic 2009 influenza A (H1N1) viruses (pH1N1) (14). The pH1N1 viruses predominated in Asia and Europe while influenza A (H3N2) viruses predominated in the Americas (14).

Manitoba: Influenza A (474 lab-confirmed cases) dominated the 2010/2011 influenza season, consistent with previous seasons (15). Twelve lab-confirmed cases of influenza B were reported for the same season (15). Incidence rate for influenza A was highest in the < 1 year age group (195 per 100,000 population) followed by the > 79 year age group (190 per 100,000 population) (15). The majority of cases of influenza B for the 2010/2011 influenza season occurred among children < 15 years of age (15). Thirty-eight lab-confirmed outbreaks were reported for the 2010/2011 influenza season; all were influenza A (15). Refer to the end-of-season flu reports available at: www.gov.mb.ca/health/publichealth/surveillance/reports.html#influenza .

6.4 Incubation Period

Usually two days but ranges from one to four days (3-4).

6.5 Host Susceptibility and Resistance

Susceptibility depends upon natural or vaccine induced levels of protective immunity in the population, the age and condition of the population (refer to Table 1 for risk factors), strain virulence and the extent of antigenic variation of new viruses (3).

6.6 Period of Communicability

Adults can transmit influenza from the day before symptom onset until approximately five days after

(4). Children can transmit influenza for 7-10 days after onset of illness or longer (3, 4). Immunocompromised individuals may shed virus for longer periods (3).

7. Laboratory Diagnosis

During influenza season, viral testing should be considered for individuals with ILI only if the results might influence clinical management.

7.1 Virus Detection

Nucleic acid amplification testing (NAAT) is the test used to confirm infection. Infection may also be confirmed by isolation of influenza viruses by culture and/or by identification of viral antigens. When testing is indicated, specimens should be taken as close to onset of illness as possible, preferably within five days of onset (16). The Cadham Provincial Laboratory (CPL) respiratory virus specimen collection procedure is available at:
http://www.gov.mb.ca/health/publichealth/cpl/docs/nasopharyngeal_collection.pdf

All specimens should be transported with a cold pack (to maintain a temperature of approximately 4°C) to CPL as soon as possible. Type of testing performed and turnaround times for results will vary. For urgent testing, CPL should be contacted at 204-945-6953 or after hours at 204-945-6655 to make arrangements. If an unusual or highly virulent form of influenza is suspected, the lab should be notified prior to sample submission at one of the above numbers.

7.2 Serology

Serologic testing is not recommended for detection and management of acute illness (16). Serology should only be requested after consultation with Cadham Provincial Laboratory.

7.3 Specimen Submission

An appropriately labeled requisition MUST accompany each specimen destined for Cadham Provincial Laboratory (CPL). Ensure that both the specimen and the requisition are clearly labeled with the specimen date, patient's name and another unique identifier such as PHIN or DOB.

7.4 Typing and Resistance Analysis

CPL can determine whether a detected influenza virus is type A or B. Hemagglutinin antigen determination is also available, but may not be routinely performed (e.g., H1 or H3). Variant typing (e.g., Brisbane vs. Hong Kong) is currently carried out at the National Microbiology Lab (NML) in Winnipeg. Antiviral drug resistance testing is available after consultation with CPL at 204-945-6953.

8. Management and Control

8.1 Case Management

Clinical judgement based on underlying conditions, disease severity and time since symptoms onset are important factors in treatment.

- Investigation for source of infection and contacts is not recommended during annual seasonal influenza epidemics (3).
- Cases should be monitored for bacterial complications and antibiotics prescribed accordingly (3).
- Salicylates should not be given to children with probable or confirmed influenza because of the association with Reye syndrome (3).
- Hospitalized cases should be managed with Routine Practices and Droplet/ Contact Precautions.
- Clinicians should take the most recent local antiviral susceptibility patterns into account if known when prescribing antivirals (3).
- Virus testing is not required in order for treatment to be initiated.
- When indicated, treatment with antivirals should be initiated within 48 hours of ILI onset (3); antiviral treatment might still be beneficial in patients with severe, complicated or progressive illness and in hospitalized patients when administered > 48 hours from illness onset (17). Refer

to Table 1 for risk groups and Section 8.34 for information on oseltamivir.

8.2 Contact Management

- Routine antiviral chemoprophylaxis of asymptomatic contacts is not recommended.
- Antiviral chemoprophylaxis may be considered for asymptomatic contacts in rare circumstances (e.g., severely immunocompromised person) in consultation with an expert (5, 16,18).

8.3 Institutional Outbreak Management

8.31 Pre-outbreak Planning

- ILI surveillance processes should be in place.
- A facility outbreak management plan detailing roles, responsibilities and investigation, control and communication processes should be in place and reviewed regularly.
- All institutions should have current physician standing orders for influenza antiviral medications for patients/ residents.
- Patients/residents should be immunized (unless contraindicated) according to current Manitoba Health recommendations available at: http://www.gov.mb.ca/health/flu/index.html .
- Health care workers (HCWs) should be immunized annually with influenza vaccine unless contraindicated.

8.32 Viral Testing during Outbreaks

- If a resident of an institution not known to have any cases of influenza develops ILI, a nasopharyngeal swab/aspirate should be collected immediately for rapid antigen testing.
- No more than six persons who are ill with ILI should be swabbed at one time.
- Even if influenza is established as the cause of the outbreak, nasopharyngeal swabs should continue to be collected from one or two apparent new cases (staff or residents) every three or four days to confirm the duration of the outbreak and monitor for antiviral treatment failure/ resistance.
- Laboratory outbreak testing coordination and outbreak code assignment can be arranged through a Medical Officer of Health or by contacting the CPL Outbreak Coordinator at 204-945-7473. Refer also to the CPL Guide to Services available at: http://www.gov.mb.ca/health/publichealth/cpl/documents.html .

8.33 Control

Infection Control during Institutional Outbreaks:

- Any unimmunized staff and residents should be offered immunization unless contraindicated. This may not prevent illness during the current outbreak, but will provide protection against different strains should they circulate later in the season.
- Institutional staff with ILI should immediately notify Occupational Health and/or Infection Prevention and Control for the facility/regional program in which they work and in consultation with them determine when it is appropriate to return to work.
- In order to protect vulnerable patients in an outbreak, it is reasonable to exclude from direct patient care HCWs who develop confirmed or probable influenza and unvaccinated HCWs who are not taking antiviral prophylaxis. Health care organizations should have policies in place to deal with this issue (6).
- Cohorting of ill residents if appropriate (16).

- Ill residents should be confined to their rooms while they are acutely ill until asymptomatic (at least 72 hours) as this may prevent spread of infection.
- Group activities should be stopped, reduced or restricted to a given ward.
- New admissions should be cancelled if appropriate and feasible; if not possible, immunization and chemoprophylaxis should be provided to the new admissions.
- Visitors should be notified so those at high risk of complications from influenza may elect to cancel their visit.
- Individual staff members should work with either ill or well residents. If they must work with both, they should move from non-infected to infected patients ensuring adherence to Routine Practices between.
- Education of residents, visitors and staff in cough etiquette and hand hygiene (3).

Antiviral Treatment during Institutional Outbreaks:

- All residents with laboratory-confirmed influenza virus infection should be treated with an appropriate influenza antiviral medication (16).
- After one case of laboratory-confirmed influenza has been detected, all cases should be considered for treatment where appropriate (16).

Antiviral Chemoprophylaxis during Institutional Outbreaks:

The regional Medical Officer of Health (MOH) will determine which residents and staff require antiviral chemoprophylaxis. Generally, antiviral chemoprophylaxis:

- is recommended for all residents, regardless of influenza vaccination history, who are not already ill with ILI (16).
- should be considered for all unimmunized staff who provide care to persons at high risk of complications (16, 17).
- should be considered for HCWs, regardless of vaccination status during outbreaks that are not well matched by the vaccine (16).

Manitoba Health will cover the cost of antiviral chemoprophylaxis in outbreak settings for all residents and the following staff providing direct resident/patient care:

- Where immunization was not conducted due to documented medical reason (e.g., allergy).
- Those who are unimmunized and do not have a documented medical reason, but where antiviral chemoprophylaxis is deemed necessary at the discretion of the Medical Officer of Health (e.g., HCW cannot be excluded from providing direct patient care due to staff shortages).
- Where immunization was conducted but the vaccine may have decreased efficacy (e.g., immunocompromised, outbreak strain not well matched by the vaccine).

Ordering Antiviral: Oseltamivir is stored at the provincial vaccine warehouse. Call 204-633-2621 or 1-800-665-7315. After hours: 204-781-5342. Specify the number of 75 mg capsules and the destination. Product will be shipped as full packages containing 10 capsules each.

8.34 Information on Oseltamivir (Tamiflu®)

Asymptomatic adult residents should receive prophylaxis at 75 mg OD for 10 days or until the outbreak is determined to be over, whichever occurs first. If the outbreak is not over after 10 days, the local Medical Officer of Health should be consulted to see if prophylaxis should continue.

Recovered patients/residents with prior, laboratory-confirmed influenza A or B during the outbreak in question do not require treatment or prophylaxis.

If a resident receiving prophylaxis appears to develop influenza, dosage should be increased to 75 mg p.o. b.i.d. for five days, after which no more oseltamivir should be prescribed. In order to document the failure of prophylaxis, a nasopharyngeal aspirate or swab or throat swab should be collected when feasible.

Pediatric dosing is available at: http://www.ammi.ca/pdf/UseOfAntiviralDrugs.pdf . Consultation with Pediatric Infectious Diseases is recommended for antiviral treatment/prophylaxis of children < 1 year of age.

When considering use of influenza antiviral medications, clinicians must consider the patient's age, weight and renal function; presence of other medical conditions; indications for use (i.e., chemoprophylaxis or therapy); and the potential for interactions with other medications (11). Use of oseltamivir has not been studied among persons with liver disease (17). Oseltamivir dosages may need to be modified based on the presence of renal disease or other co-morbidities. Refer to product monograph and insert for details.

Pregnancy should not be considered a contraindication to oseltamivir use (19). Pregnant women with ILI should be treated with oseltamivir (8).

The most common adverse events include headache, nausea, vomiting and abdominal pain.

8.4 Preventive Measures

- Immunization according to current Manitoba Health recommendations available at: http://www.gov.mb.ca/health/flu/index.html . Persons not currently eligible for publicly funded vaccine should be encouraged to receive the vaccine at their own cost.
- Education of the public and HCWs in cough etiquette and hand hygiene (3).
- Encouraging the public to stay home when they have ILI.

9. Travel Considerations

Immunization with the most current available influenza vaccine should be considered for all individuals who wish to avoid influenza while travelling to areas where influenza is likely to be circulating whether they meet the criteria for publicly funded vaccine or not. The effectiveness of influenza immunization for travellers may vary, depending on differences between influenza strains encountered abroad and those included in the current vaccine available in Canada. There is insufficient evidence at this time to advise in favour of or against routine re-immunization of travellers who were immunized in the fall and who are subsequently travelling to regions where influenza may be circulating in the late spring and summer months (20).

10. Additional Resources

Information for health professionals and the public is available on the Seasonal Flu website at: www.gov.mb.ca/health/flu/index.html .

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